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# REFRIGERANTS & the OZONE LAYER



Ontario

Ministry of Environment and Energy



## YOU CAN HELP PROTECT THE OZONE LAYER

Many people are concerned about the thinning ozone layer in the earth's upper atmosphere. The ozone layer filters out harmful ultraviolet (UV) radiation from the sun. This radiation may cause skin cancer and eye cataracts in humans and animals, disrupt crop growth, and kill the phytoplankton food supply for fish in oceans.

As a result of ozone depletion in the upper atmosphere, more people are taking sensible health precautions to avoid direct and long-term exposure to the sun. But we are all part of the problem, simply because many of the products we use every day can release ozone-depleting substances into the atmosphere.

There are many things we all can do to prevent the release of ozone-depleting substances. There are also things that we are required to do by law.

A new regulation by the Ontario government will help prevent the release of fluorocarbon refrigerants into the atmosphere. Some of these substances cause the thinning of the ozone layer. The regulation came into effect on March 29, 1994.

This guide answers questions about what you must do under the law. It also describes other things you can do to help save the ozone layer from even further destruction.

# A NEW LAW TO PREVENT THE RELEASE OF FLUOROCARBON REFRIGERANTS

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## 1 What are fluorocarbon refrigerants?

- These are refrigerants which contain chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) or hydrofluorocarbons (HFCs).
- There are many different varieties of CFCs, HCFCs and HFCs, each with a different "ozone-depleting potential". HCFCs are less stable and approximately 20 times less damaging than CFCs to the ozone layer. HFCs are not known to damage the ozone layer, however, they are a "greenhouse gas" linked to global warming.
- When they are released into the atmosphere, CFC and HCFC molecules are broken down by the sun's ultraviolet radiation. This creates a chlorine bi-product which then destroys ozone molecules in the ozone layer. One chlorine molecule may destroy up to 100,000 ozone molecules. CFCs, depending on the type, can last from 60 to 400 years in the atmosphere. HCFCs have an atmospheric lifetime of one to 20 years.
- HFCs were included in the regulation as a preventive measure. Pollution prevention is a fundamental philosophy of this government. It makes sense to ensure that any substitutes for CFCs are also prevented from being released into the atmosphere. It also makes it easier for service technicians, since they will not have to decide which refrigerant is regulated and which is not. All fluorocarbon refrigerants will have to be handled in the same way.

## 2 How am I affected by the new regulation?

It will affect anyone who owns or uses a refrigerator, freezer, and home and vehicle air conditioning system (referred to as "refrigeration equipment" for short). If this includes you, here's what you have to know:

- Anyone fixing or operating your refrigeration equipment who deliberately vents or releases fluorocarbon refrigerants into the atmosphere is breaking the law.
- Collection or recycling are the only alternatives to venting. This requirement for CFC refrigerants recovered from vehicle air conditioning systems has been in place since July 1991. It now applies to all fluorocarbon refrigerants used in all refrigeration equipment.



- All vehicular air conditioning (A/C) systems installed after December 1994, must use alternative refrigerants to CFCs and HCFCs. However, vehicular A/C systems with CFCs and HCFCs already in use by that date may continue to be used.

*As of October 1, 1994:*

- Your refrigeration equipment must be fixed by a certified person before it can be refilled with a fluorocarbon refrigerant. These persons must have an "Ozone Depletion Prevention Card" which shows that they have completed a course and an examination approved by the Ministry of Environment and Energy on the use and handling of ozone-depleting substances in refrigeration. *Ask to see their card.*
- You cannot dismantle or throw out non-household refrigeration equipment unless it has been tagged/labelled free of ozone-depleting substances by a certified person. Non-household refrigeration equipment includes car air conditioning systems and refrigeration equipment used in commercial and institutional applications.
- You cannot buy fluorocarbon refrigerants "over the counter". They can only be sold by a manufacturer to a wholesale refrigerant supplier or to a certified person.

*As of December 1, 1995:*

- You cannot dismantle or throw out refrigeration equipment, such as refrigerators and air conditioning systems, used in the home unless it has been tagged/labelled free of ozone-depleting substances by a certified technician.

### 3 *What are some common brand names of fluorocarbon refrigerants?*

- Freon, Genitron and Kléa are the most common. SUVA is a brand name for HCFCs and HFCs. Also, many fluorocarbon refrigerants, such as CFC-12 and CFC-113 are simply referred to as R-12, R-113, etc. R-500 and R-502 are blends of CFCs and HCFCs.
- For more information on the regulation, see *For Your Information: A Regulation to Prevent the Release of Fluorocarbon Refrigerants* PIBS2950, Ministry of Environment and Energy, Spring 1994.

## ON THE ROAD: CARS, TRUCKS & OTHER MOTORIZED VEHICLES

### 1 *What type of fluorocarbon refrigerants are currently being used in most vehicle A/C systems?*

- Chlorofluorocarbon-12, or CFC-12 or R-12 for short, is the most common type.
- Typical automotive A/C systems contain 1.4-3.0 kg of refrigerant. They are more prone to leak than home air conditioners due to the effects of vibration.
- By the end of 1994 all new model cars will use HFC-134a as a refrigerant. Though HFC-134a is not thought to deplete the ozone layer, it is a "greenhouse gas".

### 2 *How do I know if the A/C system in my vehicle is leaking?*

- Automotive A/C systems depend on a full charge of refrigerant to perform properly. If it seems like your A/C system is blowing warmer air than usual, chances are that the system has lost refrigerant. Have the vehicle serviced by a certified technician to confirm your suspicions.
- When you take your car in for servicing, the service technician will have to perform a leak test before he can add new refrigerant into your air conditioner. If a leak is found your car will be tagged as "leaking" and it is then your decision if you would like the leak fixed, or if you would like to take your car to another service centre for the repair.
- The service technician can not remove the existing refrigerant from your car, if any is left, without your permission. When you give your permission to go ahead with the repair, then the technician will evacuate the refrigerant from the system, perform the repair work, and refill your car with the same type of refrigerant as was extracted. Your car will then be tagged as "leak fixed".

### 3 *What can I do to prevent the release of fluorocarbon refrigerants from my current vehicle A/C system?*

- Try to cut back on the use of your A/C system. Window glazing, interior ventilation, and windshield shades will help prevent heat build-up in the car. You can go even further: Make the A/C system inoperable by having a

certified technician recover the refrigerant and not replace it. (Find out if this is possible. In some car models removing the refrigerant might also render the heating system inoperable.)

- If you leave the A/C operable, run the A/C system in your car for 10 minutes at least once a week all year long. This will lubricate the seals and lengthen their life. In many cars built in the late 1980s, defroster operation automatically engages the A/C system.
- Have the A/C system regularly checked for wear. One cracked seal and the refrigerant is gone. It is against the law to have your A/C system recharged if it is leaking. Fix it first! Always have your A/C system serviced at a place that recovers and recycles CFCs and other fluorocarbon refrigerants.
- A major component in your vehicle A/C system is its "filter dryer." The filter traps moisture and contaminants in the A/C system. When it becomes saturated, the excess moisture mixes with the refrigerant and creates a highly caustic acid. This acid is the number one cause of system failure because it literally eats away at the system components. Although most qualified technicians are aware of this, surveys show that many filter dryers are not replaced when necessary. Insist that your service technician replaces the filter dryer during compressor replacement, when signs of contamination are evident, or if the system has lost all of its refrigerant.

#### *4 Can I replace the CFC refrigerant in my vehicle with one that is less harmful to the ozone layer?*

- Currently, suppliers of refrigerant and automotive A/C parts are investigating reasonably-priced replacement components capable of functioning with HFC-134a. Check with your car dealer to find out when retrofit kits are expected to be available on the market.

#### *5 What do I do with the A/C system in my current vehicle after December 31, 1995?*

- You can continue to use it. However, you should ensure that it is not leaking CFCs or other fluorocarbon refrigerants. Have it inspected annually and repaired by a qualified technician who is certified to handle fluorocarbon refrigerants.
- Only recycled CFC refrigerants will still be available to recharge A/C systems after December 31, 1995.



**6 *Can I sell my vehicle if it has an A/C system using CFCs?***

- Yes. But if it is leaking you should get it fixed or notify the new owner that it should be fixed.

**7 *What should I do if I am buying a used vehicle with an A/C system using CFCs?***

- Ask the current owner or dealer to provide proof that the A/C system has been properly inspected and fixed if necessary.

**8 *Can I or anyone else dismantle the A/C system in my vehicle?***

- Only if the system has been drained and tagged as empty by a certified technician who has a valid Ozone Depletion Prevention Card (as of October 1, 1994).

**9 *Who is responsible for ensuring that an A/C system is properly drained prior to a vehicle being scrapped?***

- Whoever ends up owning the vehicle just before it is scrapped.

## **IN THE HOME: REFRIGERATORS, FREEZERS, AIR CONDITIONING SYSTEMS & HEAT PUMPS**

**1 *Which models of refrigerators, freezers and home A/C systems contain CFCs and HCFCs?***

- Just about all of them. Refrigerators and freezers tend to use CFC-12 (R-12). Most home air conditioning systems and heat pumps use HCFC-22, which has a lower ozone-depletion potential.
- Some manufacturers of refrigerators are developing new models which use HFC-134a (or R-134a). A replacement for HCFCs in home A/C systems is not yet commercially available.
- Small "cube" refrigerators (often used on boats, recreational vehicles and in cottages) are run on ammonia or propane. However, these are not as efficient as fluorocarbon-based refrigerants, and they can be dangerous to human health if they leak in confined spaces.

**2 What should I look for when buying a new refrigerator, freezer or home A/C system containing CFCs and HCFCs?**

- Check the Energuide ratings for the lowest energy usage. Buy the smallest refrigerator that will satisfy the needs of your household. Not only will this save electricity, it will also save on the amount of refrigerant used.
- Buy a quality product from a reputable dealer rather than shopping just for price alone.
- Buy from a dealer who also services and fixes refrigeration equipment; and where possible, takes back old refrigeration equipment for recycling. Ask if the dealer recovers the fluorocarbon refrigerant for recycling.

**3 What do I do to prevent the release of fluorocarbon refrigerants from my current refrigerator, freezer or home A/C system?**

- Do not dismantle the equipment yourself. Call a qualified repair technician.
- Use of sharp objects to remove ice build-up in freezers and freezer compartments can rupture tubing which contains CFCs. Also, if you move or transport the equipment be very careful that it is not bumped or dropped which can cause the seals to rupture. If you think that your equipment has been damaged, call a qualified repair technician immediately.
- Ensure that the repair technician uses recovery and recycling equipment when servicing your fridge, freezer or A/C system. Do not let anyone vent the refrigerant. As of October 1, 1994, only technicians in possession of an Ozone Depletion Prevention Card, issued under the authority of the Ministry of Environment and Energy can fix, refill or drain refrigeration equipment.
- If buying a new refrigerator, air conditioner, etc., ask the retailer if they will take your used equipment.
- Avoid the use of air conditioners altogether. Cool your home with ceiling fans, improved insulation and ventilation systems, window shades, drapes and shade trees.

**4 If a refrigerant leaks in my house, is this harmful to my health?**

- CFCs, HCFCs and HFCs are generally not harmful at the very low concentrations found in domestic refrigeration equipment.



**5 *How do I find a certified technician to repair my refrigerator, freezer or home A/C system?***

- Contact a reputable repair firm or go to the manufacturer. Ensure that the service technician is certified in the trade, where applicable, and ask to see their Ozone Depletion Prevention Card.

**6 *How do I know if the refrigerant has been properly removed from my refrigerator, freezer or home A/C system?***

- There is no way of knowing from visual inspection. A certified technician will replace a tag on the equipment stating that the system is empty.

**7 *Can replacement refrigerants be used in my current refrigerator, freezer or home A/C system?***

- Currently, no. However, refrigerant blends may soon be available which will be able to be used when your present equipment is retrofitted. Contact the manufacturer to find out if a "drop in" replacement is acceptable and available.

**8 *What should I do if I want to throw out my old refrigerator, freezer or home A/C system?***

- Have them properly drained and sealed by a qualified repair technician. As of October 1, 1994, only certified technicians with an Ozone Depletion Prevention Card can drain refrigerant. They must also tag that the equipment is empty. This will be a requirement after December 1, 1995.
- Call the municipal department responsible for garbage collection in your neighbourhood. Many municipalities collect "white goods" (stoves, fridges, freezers, etc.) for recycling purposes. Find out who is responsible for draining the equipment of the refrigerant before it goes to disposal.
- Arrange for the old equipment to be picked up by a salvage company or a retailer who fixes old equipment for resale. Ensure that they are certified to recover the refrigerant for recycling purposes.

## YOU DO MAKE A DIFFERENCE

Some people may think that their actions to protect the environment do not count for much. That's not true. Consider these facts:

- There are 5 million home refrigerators and freezers in use in Ontario. Some 270,000 new home refrigerators were sold in 1992. An estimated 48,000 to 60,000 home refrigerators are thrown out every year in Ontario.
- There are 600,000 window air conditioners and 1.1 million central air conditioning units in residential use in Ontario.
- An estimated 3.6 million cars and 500,000 trucks in Ontario have air conditioning systems.

When you add up the actions of environmentally responsible consumers, retailers, manufacturers, and service people to prevent the release of ozone-depleting refrigerants, it can make quite a difference!

Consumer pressure helped Canada go CFC-free in aerosols years ahead of the rest of the world. Our dollar power can speed up the development of alternatives and substitutes for ozone-depleting substances.

The best strategy for protecting the ozone layer is to avoid purchasing products containing ozone-depleting substances. In some cases, however, consumer products containing these substances are already in use in our homes, cars and workplaces. They cannot be easily replaced. A second strategy, therefore, involves proper care and maintenance of equipment to ensure that ozone-depleting substances are never released and that the existing total quantity of those substances are properly recovered for recycling purposes.



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*Moog Canada*

## FOR MORE INFORMATION

This guide and other ministry publications on the control of ozone-depleting substances are available by writing or calling:

Public Information Centre

Ministry of Environment and Energy

135 St. Clair Ave. W.

Toronto, Ontario M4V 1P5

(416) 323-4321 or

1-800-565-4923 toll free long distance















